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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/715,867 11/17/00 WANG

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EXAMINER

MM91/1022

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ART UNIT

PAPER NUMBER

2873

DATE MAILED:

10/22/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/715,867

Applicant(s)

Wang et al.

Examiner

Tuyen Q Tra

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 20-40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-12 and 18 is/are rejected.
- 7) ☐ Claim(s) 5, 13-17 and 19 is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☒ Interview Summary (PTO-413) Paper No(s). 5
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

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Restriction/Election

1. Restriction to one of the following inventions is required under 35 U.S.C. § 121:

I. Claims 1-19, drawn to spatial light modulator device, classified in Class 359, subclass 254.

II. Claims 20-40, drawn to the method of fabrication of spatial light modulator, classified in class 250, subclass 208.1.

The inventions are distinct, each from the other because of the following reasons:

Each of the invention, I and II, recites limitations not recited in any of the other invention. The differing limitations make the inventions I and II patentably distinct from one another, i.e. a reference that anticipates or makes obvious one of the inventions I and II would not, by itself, anticipate or make obvious any of the remaining invention.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

2. During a telephone conversation with David Thidodeau on 10/10/01 a provisional election was made without traverse to prosecute the invention of group I, claims 1-19.

Affirmation of this election must be made by applicant in replying to this Office action. Claims 20-40 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

DETAILED ACTION

Oath/Declaration

4. The declaration filed 11/17/00 has been accepted.

Priority

5. Receipt is acknowledged of papers submitted under 35 U.S.C.119(e), which papers have been placed of record in the file.

Drawings

6. The Drawings filed on 11/17/00 have been declared informal by the examiner. The drawings in this application are objected to by the Draftsperson as for the reasons noted on the attached Notice of Draftsperson's Patent Drawing Review, form PTO-948.

Specification

7. The specification is objected to because of the following informalities:
On page 10, line 12, numbers "21" should be "20 ". Or appropriate correction is required.

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Claim Objections

8. Claims 13 and 15 are objected to because of the following informalities:

- In claim 13, "PZT" should be "PLZT".

- In claim 15, "a first mirror underneath a first mirror underneath the electro-optic material" should be "a first mirror underneath the electro-optic material". Appropriate correction is required.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-3, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gobeli (U.S. Pat. 5,768,003).

With respect to claim 1, Gobeli discloses a spatial light modulator and method comprising of a pixel including a solid state electro-optic material 10A (see Abstract) positioned between a first electrode 15A and a second electrode 15B; and a pixel circuit formed with a semiconductor substrate, the pixel being connected to the pixel circuit (col. 2, line 30-38; line 6-8). Gobeli discloses all elements of the invention, as is noted above, with the exception of an array of pixels and an array of pixel circuits. It would have been obvious to one skill in the art at the time invention was made to make an array of pixel and an array of pixel circuits, since it has

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been held that mere duplication of the essential working parts of a device involves only routing skill in the art.

With respect to claims 2 and 3, Gobeli discloses a spatial light modulator and method comprising of a pixel including a solid state electro-optic material 10A in which solid state electro-optic material 10A comprising of PLZT. However, Gobeli does not implicitly disclose that solid state electro-optic material 10A comprising of ceramic material. The selection of ceramic material in place of PLZT is seem as design experience upon the environment of use to ensure optimum performance. In addition, the Applicant has presented no discussion in the specification that convinces the Examiner that the particular ceramic material could produce functional differences or unobvious results. Therefore, it would have been obvious at the time the invention was made to a person having skill in the art to use ceramic material instead for matter of design choice.

With respect to claim 9, Gobeli further discloses a light source and an optical coupler (col. 6, line 46-47).

11. Claims 4, 8, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gobeli (U.S. Pat. 5,768,003), as applied to claim 1, in view of Robinson et al. (U.S. Pat. 6,091,463).

a) With respect to claim 4, Gobeli discloses a spatial light modulator and method comprising of a pixel circuit formed with semiconductor substrate. However, Gobeli does not

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implicitly disclose pixel circuits comprising of an array of transistors formed on a silicon substrate. Within the same field of endeavor, Robinson et al. discloses a diffractive spatial light modulator comprises pixel circuits comprising of an array of transistors formed on a silicon substrate (col. 4, line 20-29, Fig. 2).

It would have been obvious, therefore, at the time the invention was made to a person having skill in the art to construct a spatial light modulator and method with a pixel circuit formed with semiconductor substrate such as disclosed by Gobeli, with pixel circuits comprising of an array of transistors formed on a silicon substrate such as discloses by Robinson et al., for purpose of driving circuit to mirror.

b) With respect to claims 8, 10 and 11, Gobeli discloses a spatial light modulator and method comprising of circuits formed with substrate. However, Gobeli does not teach the semiconductor substrate comprises a CMOS integrated circuit, a memory circuit co-located with each pixel, and each pixel circuit comprises a random access memory. Within the same field of endeavor, Robinson et al. disclose a spatial light modulator with semiconductor comprises a CMOS integrated circuit (col. 2, line 38-41), a memory circuit collocated with each pixel, and each pixel circuit comprises a RAM (col. 4, line 33-40).

It would have been obvious, therefore, at the time the invention was made to a person having skill in the art to construct a spatial light modulator with circuits formed with substrate such as disclosed by Gobeli, with the semiconductor substrate comprises a CMOS integrated circuit, a memory circuit co-located with each pixel, and each pixel circuit comprises a random access memory such as discloses by Robinson et al., for purpose of controlling pixels.

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12. Claims 6, 12 and 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gobeli (U.S. Pat. 5,768,003), as applied to claim 1, in view of Birnbach et al. (U.S. Pat. 4,786,128).

a) With respect to claims 6 and 12, Gobeli discloses a spatial light modulator and method comprising of an electro-optic material. However, Gobeli does not implicitly disclose that the electro-optic material comprising of plurality of layers. Within the same field of endeavor, Birnbach discloses a spatial light modulator with electro-optic material is a plurality of electro-optic material layers (col. 7, line 17-18, Fig.13).

It would have been obvious, therefore, at the time the invention was made to a person having skill in the art to construct a spatial light modulator with electro-optic material such as disclosed by Gobeli, with electro-optic material comprising of a plurality of layers such as discloses by Birnbach, for purpose of simplifying manufacturing process.

b) With respect to claim 18, Gobeli discloses a spatial light modulator and method comprising of electro-optic material layer, first and second electrodes. However, Gobeli fails to teach first and second electrodes comprises of an optically transmissive conductive material. Within the same field of endeavor, Birnbach discloses a spatial light modulator with electrodes 14 and 16 comprise of layer L1 and L2 are optically transmissive conductive material (col. 5, line 1-3).

It would have been obvious, therefore, at the time the invention was made to a person having skill in the art to construct a spatial light modulator with a first and second electrodes such as disclosed by Gobeli, with first and second electrodes material comprising of an optically

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transmissive conductive material such as discloses by Birnbach, for purpose of transmitting light to mirror.

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gobeli (U.S. Pat. 5,768,003), as applied to claim 1, in view of Bowman et al. (U.S. Pat. 5,637,883).

Gobeli discloses a spatial light modulator and method comprising of electrode layers. However, Gobeli does not implicitly disclose that the electrode layers comprises of an electrically conductive layer that contacts a dielectric layer. Within the same field of invention, Bowman et al. discloses a spatial light modulator comprises an electrode layer comprising of an electrically conductive layer 28 that contacts a dielectric layer 26 (see Fig.1).

It would have been obvious, therefore, at the time the invention was made to a person having skill in the art to construct a spatial light modulator with electrode layers such as disclosed by Gobeli, with an electrode layer comprising of an electrically conductive layer 28 that contacts a dielectric layer 26 such as discloses by Bowman et al., for purpose of forming a mirror layer in spatial light modulator.

Allowable Subject Matter

14. Claims 5, 13-17 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The reason for the indication of allowable subject matter is that the electro-optic material comprises a thin film layer having a thickness of 2000 nm or less; or a first electro-optic layer

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comprises a first electro-optic material and additional layers comprise a second electro-optic material wherein the first layer comprises PLZT/ the additional layers comprise PLZT; or a first mirror underneath the electro-optic material and a second mirror above the electro-optic material; or a first layer of dielectric material underneath the electro-optic material and a second layer of dielectric material above the electro-optic material; or a copper interconnect extending from each pixel mesa along a mesa sidewall to a circuit contact of a pixel circuit disclosed in the claims is not found in the prior art.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuyen Tra whose telephone number is (703) 306-5712. The examiner can normally be reached on Monday to Friday from 8:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps, can be reached on (703) 308-4883. The fax number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

Examiner: Tuyen Tra

Date: October 10, 2001


Hung Xuan Dang
Primary Examiner